



GAMING MACHINE

BACKGROUND OF THE INVENTION

5 Field of the Invention

[0001]

The present invention relates to a gaming machine such as a slot machine or a pinball machine (a so-called "Pachinko machine" in Japan) for the player to play a game using game medium.

10 Description of the Related Art

[0002]

A recent slot machine including stop buttons (a so-called "pinball slot machine" or a so-called "Pachi-Slot machine" in Japan) has a mechanical variable display means provided with a plurality of rotatable reels for variably displaying symbols in a front display window or an electrical variable display means for displaying symbols on reels on a screen. As the player performs start operation, control means controls the variable display means for rotating the reels, thereby variably displaying symbols. Then, the rotating reels are stopped in order automatically in a given time or as the player performs stop operation. At this time, if the symbols on the reels appearing in the display window become a specific combination (winning symbol combination), game medium such as medals or coins are paid out to the player as the profit of the winning game.

[0003]

In a slot machine in a related art, to resolve the situation in which the vicinity of an exit to which game medium such as medals are paid out, which will be hereinafter referred to as 5 medal payout opening, is dark and is hard to see, light emitted from illumination light provided in a decorative panel is introduced into the medal payout opening for illumination. A semitransparent plate is screwed and placed between the illumination light and the medal payout opening, thereby to 10 produce the decorative effect and the advertising effectiveness.

[0004]

The decorative effect includes, for example, coordinating of the color that can pass through the semitransparent plate with the color of the installation location, fitting characters and 15 symbols to the game play location and the gaming machine. Thus, the semitransparent plate screwed and placed between the illumination light and the medal payout opening is used to also produce other effects than the illumination effect, and is an important component.

20 [0005]

The structure described above is disclosed in
JP-A-11-313955.

SUMMARY OF THE INVENTION

25 [0006]

However, in the gaming machine in the related art, the semitransparent plate is fixed to a decorative panel. Therefore, there occurs a problem that assembling the semitransparent plate to the decorative panel, replacement and manufacturing takes
5 quite time.

In the gaming machine in the related art, there is also a problem that a print peculiar to the model is applied to the decorative panel, is unsuitable for recycling and it takes time in recycling the semitransparent plate fixed to the decorative
10 panel.

It is therefore an object of the invention to provide a gaming machine that shortens the time taken for assembling a semitransparent plate placed between an illumination light and a medal payout opening to a decorative panel, and the time taken
15 for replacing and manufacturing.

[0007]

According to the invention, there is provided a gaming machine including: symbol row display means (for example, left reel 3L, center reel 3C, right reel 3R) configured to display
20 a plurality of symbols for a player to arrange the symbols; operation input means including a lever or a button (for example, start lever 6, left stop button 7L, center stop button 7C, right stop button 7R) to be operated by the player to play a game; internal lottery means (for example, main control circuit 71)
25 configured to carry out an internal lottery of the game with a

random number; illumination means (for example, illumination light member 104) configured to illuminate a tray formed on a cabinet of the gaming machine; and a transparent member detachably disposed between the illumination means and the tray.

5 According to the configuration, the transparent member is placed detachably between the illumination means and the tray, thus making it possible to provide the gaming machine that can shorten the time taken for assembling the semitransparent plate placed between the illumination light and the medal payout 10 opening to a decorative panel, and the time taken for replacing and manufacturing.

[0008]

In the gaming machine of the invention, the transparent member may include a bottom member for transmitting light from 15 the illumination means, a rear member fixed roughly at right angles with the bottom member, and a side member fixed between the rear member and the bottom member. According to the configuration, the transparent member is made up of the bottom member, the rear member, and the side member, thus making it 20 possible to provide the gaming machine that can shorten the time taken for assembling the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and manufacturing, and can be fixed with good stability.

25 [0009]

In the gaming machine of the invention, the transparent member may be formed of a plastic member. According to the configuration, the transparent member is formed of a plastic member, thus making it possible to provide the gaming machine
5 that can shorten the time taken for assembling the semitransparent plate, etc., placed between the illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and manufacturing, and can be made hard to destroy.

10 [0010]

In the gaming machine of the invention, the transparent member may be sandwiched and fixed between a belly panel fitted into the cabinet and the cabinet. According to the configuration, the transparent member is sandwiched and fixed between the belly
15 panel fitted into the cabinet and the cabinet, thus making it possible to provide the gaming machine that can shorten the time taken for assembling the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and
20 manufacturing, and can be fixed with good stability.

[0011]

In the gaming machine of the invention, the transparent member may be colored. According to the configuration, the transparent member is colored, thus making it possible to provide
25 the gaming machine that can shorten the time taken for assembling

the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and manufacturing, and can produce the decorative effect.

5 [0012]

In the gaming machine of the invention, the transparent member may be decorated with a character, a sign, or a design. According to the configuration, the transparent member is decorated with a character, a sign, or a design, thus making it 10 possible to provide the gaming machine that can shorten the time taken for assembling the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and manufacturing, and can produce the decorative effect.

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BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a drawing to show an embodiment of a gaming machine according to the invention and is a perspective view to show the 20 appearance of a pinball slot machine as a gaming machine;

FIG. 2 is a drawing to show a state in which a display screen is fully liquid crystal display and reels placed at the back of the liquid crystal are displayed through the display screen;

FIG. 3 is a drawing to show the configuration of a liquid 25 crystal display in the embodiment of the invention;

FIG. 4 is a drawing to show symbol rows drawn on the outer peripheral surfaces of the reels in the embodiment of the invention;

FIG. 5 is a drawing to show prizes and numbers of payout medals corresponding to winning symbol combinations in the embodiment of the invention;

FIG. 6 is a block diagram to show the configuration of a main control circuit in the embodiment of the invention;

FIG. 7 is a drawing to show a winning stop control table in the embodiment of the invention;

FIG. 8 is a drawing to show a forward push, center push losing stop control table in the embodiment of the invention;

FIG. 9 is a drawing to show a reverse push losing stop control table in the embodiment of the invention;

FIG. 10 is a block diagram to show the configuration of a sub-control circuit in the embodiment of the invention;

FIG. 11 is a front view to show the structure of the cabinet portion of a panel display unit with a transparent member is removed;

FIG. 12 is a perspective view to show the structure of the cabinet portion of the panel display unit with the transparent member is removed;

FIGS. 13A and 13B are perspective views to show the structure of the transparent member;

FIG. 14 is a front view to show the structure of the cabinet

portion of the panel display unit to which the transparent member is attached;

FIG. 15 is a perspective view to show how the transparent member is attached to the cabinet portion of the panel display unit; and

FIG. 16 is a sectional side view to show how the transparent member is sandwiched between a belly panel and the cabinet of the panel display unit.

10 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013]

Referring now to the accompanying drawings, there is shown a preferred embodiment of the invention.

FIG. 1 shows an embodiment applying a gaming machine according to the invention to a pinball slot machine (a so-called "Pachi-Slot machine" in Japan). FIG. 2 shows a state that a full screen display is not displayed by a liquid crystal display in display screen 5a and a member such as reels 3 disposed at the back of the liquid crystal are displayed through the display screen 5a.

[0014]

In FIG. 1, a pinball slot machine 1 as a gaming machine is provided for the player to play a game using game medium such as a card storing information of the game play value given to the player as well as coins, medals and tokens. In the

description that follows, it is assumed that the player uses medals.

[0015]

A panel display unit 2a substantially made vertical is formed at the front of a cabinet 2 forming the whole of the pinball slot machine 1, and a liquid crystal display 5 having a rectangular 15-inch liquid crystal display screen 5a is provided on the front of the panel display unit 2a. An image can be displayed over the full face of the display screen 5a. BET lamps 9a, 9b, and 9c, a WIN lamp 17, a payout display unit 18, a credit display unit 19, and a bonus game information display unit 20 are displayed under the control of a main control circuit 71 outside the liquid crystal display screen 5a.

[0016]

The configuration of the liquid crystal display 5 is as shown in FIG. 3. In FIG. 3, a transparent acrylic plate 501 is provided on the front of the liquid crystal display 5, followed by a reel glass base 502, a bezel metal frame 503, liquid crystal 504, a liquid crystal holder 505, a diffuser sheet 506, a light guide plate 507, a rear holder 508, and an antistatic sheet 509 which are stacked in order.

[0017]

The light guide plate 507 is a plate material subjected to special treatment (such treatment including laser beam machining) to uniformly reflect light on the back of acrylic plate.

The light guide plate 507 receives light of cold-cathode tube 511a, 511b as light source from the end face, reflecting the light on the rear, and producing uniform surface light emission. The light guide plate 507 and the rear holder 508 are formed with vertically oriented rectangular display windows (4L, 4C, and 4R in FIG. 2). The display windows 4L, 4C, and 4R are visually observed through the liquid crystal display 505. The display driver 512 is disposed in the upper part of the liquid crystal display 5 for displaying the liquid crystal 504.

10 [0018]

The antistatic sheet 509 prevents dusts from being deposited on the portion corresponding to the reel window (display window). A fluorescent tube 510 is used as a backlight for the display windows. The display windows 4L, 4C, and 4R receive light from the fluorescent tube 510, reflected light produced as the light from the fluorescent tube 510 is reflected on the surfaces of the reels 3, and light of reel backlights 513 provided for the reels 3. The light enables the player to recognize the liquid crystal 504. The reel backlights 513 each having three longitudinally placed LEDs are provided in a one-to-one correspondence with the reels 3 for illuminating the symbols on the reels 3 from the backs of the reels 3.

20 [0019]

The display windows 4L, 4C, and 4R are formed with a top line 8b, a center line 8c, and a bottom line 8d in the horizontal

direction and a cross down line 8a and cross up line 8e in the slanting directions as pay lines. As the pay lines, one, three, or five lines are made activated as the player operates a 1-BET switch 11, a 2-BET switch 12, or a MAX-BET switch 13 (described 5 later) or inserts medals into a medal insertion slot 22. Which pay lines are made activated is indicated as a BET lamp 9a, 9b, or 9c (described below) is lighted.

[0020]

In the cabinet 2b, three reels (left reel 3L, center reel 10 3C, and right reel 3R) each with a symbol row including different types of symbols placed on the outer peripheral surface are provided in a row for rotation, and are contained in symbol row display means. The player can observe the symbols on the reels through the display windows 4L, 4C, and 4R. Each reel rotates 15 at a constant speed (for example, 80 revolutions per minute).

[0021]

The 1-BET lamp 9a, the 2-BET lamp 9b, the MAX-BET lamp 9c, and a credit display unit 19 are provided on the left of the display windows 4L, 4C, and 4R. The 1-BET lamp 9a, the 2-BET 20 lamp 9b, or the MAX-BET lamp 9c is lighted in response to the number of medals bet to play one game, which will be hereinafter referred to as the BET count.

[0022]

In the embodiment, one game is over when all reels stop. 25 When the BET count is 1 and one pay line is made activated, the

1-BET lamp 9a is lighted; when the BET count is 2 and three pay lines are made activated, the 2-BET lamp 9b is lighted; and when the BET count is 3 and all the five pay lines are made activated, the MAX-BET lamp 9c is lighted. The credit display unit 19 is
5 made up of seven-segment LEDs for displaying the deposited number of medals.

[0023]

The WIN lamp 17 and the payout display unit 18 are provided on the right of the display windows 4L, 4C, and 4R. The WIN lamp
10 17 is lighted when the winning game of BB or RB is complete. It is lighted at a predetermined probability when the internal winning is accepted as BB or RB. The payout display unit 18 is made up of seven-segment LEDs for displaying the number of medals paid out when the winning game is complete.

15 [0024]

The bonus game information display unit 20 is provided in the upper right corner of the display screen 5a of the panel display unit 2a. The bonus game information display unit 20 is made up of seven-segment LEDs for displaying the number of RB games that can be played, and the possible number of winning games
20 of RB (described later).

[0025]

A frontward projection portion 10 of a horizontal plane is formed below the display screen 5a. The display screen 5a
25 displays not only the various lamps and the various display units,

but also various effects of animation, and the "operation order" required for realizing completion of the winning game when the internal winning of "small prize of bell" is accepted in the "assistance time period" described in the related art.

5 [0026]

The medal insertion slot 22 is provided at the right end of the forward projection portion 10, and the 1-BET switch 11, the 2-BET switch 12, and the MAX-BET switch 13 are provided at the left end of the forward projection portion 10. The 1-BET switch 11 enables the player to bet one of the credited medals by one push operation on a game. The 2-BET switch 12 enables the player to bet two of the credited medals by one push operation on a game. The MAX-BET switch 13 enables the player to bet as many medals as the maximum number of medals that can be bet on 15 a game by one push operation. As the player operates any of the BET switches, the corresponding pay lines are made activated as described above.

[0027]

A C/P switch 14 for the player to switch between credit 20 and payout of the medals obtained by playing games by pushbutton operation is provided on the left of the front of the forward projection portion 10. As the C/P switch 14 is switched, medals are paid out from a medal payout opening 15 in a lower part of the front and are stored in a medal reception tray 16.

25 [0028]

On the right of the C/P switch 14, a start lever 6 (contained in start operation input means) for rotating the reels for starting variable display of symbols in the display windows 4L, 4C, and 4R (starting a game) as the player operates the start lever 6 is attached so that it can be turned in a predetermined angle range.

[0029]

The speakers 21L and 21R are provided on the upper left and right of the cabinet 2, and a payout table panel 23 for displaying winning symbol combination, the number of payout medals, and the like is provided between the two speakers 21L and 21R.

[0030]

Three stop buttons (left stop button 7L, center stop button 7C, and right stop button 7R) as operation buttons contained in stop operation input means for stopping rotation of the three reels 3L, 3C, and 3R are provided at the center of the front of the frontward projection portion 10 and below the display screen 5a.

[0031]

In the embodiment, the stop operation performed by the player pushing the first stop button when all reels rotate is called "first stop operation," the stop operation next performed by the player pushing the second stop button is called "second stop operation," and the stop operation performed by the player

pushing the third stop button following the second stop operation is called "third stop operation."

[0032]

Since the pinball slot machine of the embodiment is provided with the three stop buttons 7L, 7C, and 7R, there are six different operation orders of the stop buttons. Then, the operation orders are distinguished from each other as follows: The left stop button 7L is abbreviated to "left," the center stop button 7C to "center," and the right stop button 7R to "right."

10 [0033]

To indicate the operation order, the abbreviations of the stop buttons 7L, 7C, and 7R are listed from left to right in the stop operation order. For example, when the player operates the left stop button 7L as the first stop operation, the center stop button 7C as the second stop operation, and the right stop button 7R as the third stop operation, the operation order is indicated as "left center right." In the embodiment, the six different operation orders of "left center right," "left right center," "center left right," "center right left," "right left center," 20 and "right center left" are available.

[0034]

FIG. 4 shows symbol rows each made up of 21 symbols represented on each reel 3L, 3C, 3R. The symbols are given code numbers 00 to 20 and are stored in ROM 32 (shown in FIG. 6) 25 described later as a data table.

[0035]

The symbol rows each made up of symbols of "blue 7 (symbol 91)," "red 7 (symbol 92)," "BAR (symbol 93)," "bell (symbol 94)," "plum (symbol 95)," "Replay (symbol 96)," and "cherry (symbol 97)" are represented on the reels 3L, 3C, and 3R. The reels 3L, 3C, and 3R are rotated so that the symbol rows move in the arrow direction in FIG. 4.

[0036]

FIG. 5 shows the prizes and the numbers of payout medals corresponding to the winning symbol combinations in each gaming state.

The gaming state generally is classified depending on whether or not the internal winning of BB or RB is accepted or whether or not BB or RB operates. The types of prizes having the possibility of accepting internal winning are determined according to a probability lottery table; generally, the probability lottery table is provided for each gaming state.

[0037]

That is, the types of prizes having the possibility of accepting internal winning become the same for games in the same gaming state. However, BB gaming state contains ordinary gaming state in BB and RB gaming state and contains the state in which the types of prizes having the possibility of accepting internal winning differ.

25 [0038]

As shown in FIG. 5, when "blue 7-blue 7-blue 7" or "red 7-red 7-red 7" is placed in a row along the activated line in the ordinary gaming state, a winning game of BB is complete and 15 medals are paid out to the player and the gaming state of the 5 next game enters the BB gaming state.

[0039]

The RB gaming state occurs when the symbol combination along the activated line is "BAR-BAR-BAR" in the ordinary gaming state or when the symbol combination along the activated line 10 is "Replay-Replay-Replay" in the ordinary gaming state in BB (JAC IN). At this time, 15 medals are paid out to the player.

[0040]

The RB gaming state is a gaming state in which the player easily gains a prize of paying out 15 medals to the player with 15 completion of the predetermined symbol combination "Replay-Replay-Replay" as the player bets one medal.

[0041]

The maximum number of games that can be played by the player in one RB gaming state (the number of RB games that can be played) 20 is 12. The number of winning games that can be gained in the RB gaming state (the possible number of winning games of RB) is up to eight. That is, the RB gaming state exits if the number of games reaches 12 or if the number of winning games reaches eight.

25 [0042]

The BB gaming state exits when the player performs the third stop operation in a predetermined game. For example, when the player performs the third stop operation in the last game in the third RB gaming state, the BB gaming state exits.

5 [0043]

When the symbol combination along the activated line is "Replay-Replay-Replay" in the ordinary gaming state, a winning game of replay is complete. When a winning game of replay is complete, as many medals as the number of inserted medals are 10 automatically inserted, so that the player can play a game without consuming medals.

[0044]

As symbol combination "bell-bell-bell" is placed in a row along the activated line in the ordinary gaming state or the 15 ordinary gaming state in BB, a winning game of small prize of bell is complete. When the internal winning of small prize of bell is accepted, whether or not the winning game is complete is determined by the table number (described later) and the operation order of the stop buttons 7L, 7C, and 7R by the player.

20 [0045]

Specifically, the symbol combination "bell-bell-bell" is placed in a row along the activated line and the winning game of small prize of bell is complete only if the player operates the stop buttons 7L, 7C, and 7R in the operation order of the 25 six operation orders corresponding to the table number. If the

player operates the stop buttons 7L, 7C, and 7R in any order other than the operation order corresponding to the table number, the winning game of small prize of bell becomes incomplete.

[0046]

5 It is possible to realize completion of winning games of "small prize of cherry," "small prize of BAR," and "small prize of plum" in the ordinary gaming state or the ordinary gaming state in BB. The numbers of medals paid out to the player are as shown in the figure.

10 [0047]

In the ordinary gaming state, when the internal winning of small prize of bell is accepted, time period (assistance time period or AT) is provided for notifying the player of the operation order for realizing completion of the winning game.

15 When the internal winning of small prize of bell is accepted in the time period, the player can surely realize completion of the winning game.

[0048]

There are two assistance time period lottery conditions.

20 The first lottery condition is when the internal winning of small prize of plum is accepted and the state is the ordinary gaming state. The second lottery condition is when the internal lottery is a blank in the assistance time period or concealment time period (described later). As either lottery condition is 25 satisfied, assistance time period lottery processing (AT lottery

processing) described later is performed.

[0049]

The assistance time period is made up of a plurality of successive games, which will be hereinafter referred to as a set.

5 Lottery as to the number of games in one set and the number of sets to be generated is held in the assistance time period lottery processing. The number of sets that can be generated is referred to as the number of sets. If the assistance time period lottery processing is performed in the assistance time period or the
10 concealment time period and prize in the lottery is won, the number of sets is accumulated.

[0050]

Whether or not the assistance time period is to be generated (actualized) is determined in assistance time period activation
15 processing (AT activation processing) described later. The time period having the possibility that the assistance time period will occur after the lottery condition is satisfied and prize in the AT lottery is won (specifically, the time period in which the value of a number-of-sets counter (described later) is one
20 or more in the ordinary gaming state and which is not the assistance time period) will be hereinafter referred to as the concealment time period. The time period other than the assistance time period or the concealment time period will be hereinafter referred to as the usual time period.

25 [0051]

FIG. 6 shows the circuit configuration including the above-mentioned main control circuit 71 (contained in internal lottery means) for controlling the game processing operation of the pinball slot machine, peripherals (actuators) electrically connected to the main control circuit 71, and a sub-control circuit 72 (contained in control means) for controlling the liquid crystal display 5 and the speakers 21L and 21R based on a control command transmitted from the main control circuit 71.

[0052]

The main control circuit 71 includes a microcomputer 30 placed on the circuit board as the main component and a random number sampling circuit. The microcomputer 30 includes a CPU 31 for performing the control operation in accordance with a preset program, and ROM 32 and RAM 33, both of which are provided as a storage.

[0053]

Connected to the CPU 31 are a clock pulse generation circuit 34 for generating a reference clock pulse, a frequency divider 35, a random number generator 36 for generating sampled random numbers, and a sampling circuit 37.

[0054]

For sampling random numbers, random number sampling may be executed in the microcomputer 30, namely, the operation program of the CPU 31. In this case, the random number generator 36 and the sampling circuit 37 can be omitted or can also be left

for backup of the random number sampling operation.

[0055]

The ROM 32 of the microcomputer 30 stores probability lottery tables used to determine random number sampling 5 performed each time the player operates the start lever 6 (start operation), stop control tables for determining the reel stop mode in response to operation of the stop buttons, various control commands to be transmitted to the sub-control circuit 72, and the like.

10 [0056]

The commands include a standby screen command and a start command. The commands will be discussed later. The sub-control circuit 72 does not input commands and information to the main control circuit 71 and one-way communications are conducted from 15 the main control circuit 71 to the sub-control circuit 72.

[0057]

In the circuitry in FIG. 6, the main actuators whose operation is controlled by a control signal from the microcomputer 30 include the various lamps (1-BET lamp 9a, 2-BET 20 lamp 9b, MAX-BET lamp 9c, and WIN lamp 17), the various display units (payout display unit 18, credit display unit 19, and bonus game information display unit 20), a hopper (containing a drive section for paying out medals) 40 as game play value giving means for storing medals and paying out a predetermined number of medals 25 according to an instruction of a hopper drive circuit 41, and

stepping motors 49L, 49C, and 49R for rotating the reels 3L, 3C, and 3R.

[0058]

A motor drive circuit 39 for driving and controlling the
5 stepping motors 49L, 49C, and 49R, a hopper drive circuit 41 for
driving and controlling the hopper 40, an individual lamp drive
circuit 45 for driving and controlling the various lamps, and
an individual display unit drive circuit 48 for driving and
controlling the various display units are connected to the output
10 section of the CPU 31 through an I/O port 38. Each of these drive
circuits receives a control signal such as a drive command output
from the CPU 31 and controls the operation of the corresponding
actuator.

[0059]

15 The main input signal generation means for generating an
input signal required for generating a control command by the
microcomputer 30 include a start switch 6S, the 1-BET switch 11,
the 2-BET switch 12, the MAX-BET switch 13, the C/P switch 14,
a game assistance switch 99, an inserted medal sensor 22S, a reel
20 stop signal circuit 46, a reel position detecting circuit 50,
and a payout completion signal circuit 51. These are also
connected to the CPU 31 through the I/O port 38.

[0060]

The start switch 6S detects the player operating the start
25 lever 6. The inserted medal sensor 22S detects a medal inserted

to the medal insertion slot 22. The reel stop signal circuit 46 generates a stop signal as the player operates each stop button 7L, 7C, 7R. The reel position detecting circuit 50 receives a pulse signal from a reel rotation sensor and supplies a signal 5 for detecting the position of each reel 3L, 3C, 3R to the CPU 31. The payout completion signal circuit 51 generates a signal for detecting completion of medal payout when the count of a medal detection section 40S (the number of medals paid out from the hopper 40) reaches the specified number of medals.

10 [0061]

In the circuitry in FIG. 6, the random number generator 36 generates random numbers contained in a given numeric value range and the sampling circuit 37 samples one random number at the appropriate timing after the player starts the start lever 15 6. The CPU 31 determines the internal winning combination based on the random number thus sampled and the probability lottery table stored in the ROM 32. Therefore, the CPU 31 implements winning state determination means for determining the winning state of the game, namely, the internal winning combination by 20 random number lottery.

[0062]

After rotation of each of the reels 3L, 3C, and 3R is started, the number of drive pulses supplied to each of the stepping motors 49L, 49C, and 49R and the counts are written into a predetermined 25 area of the RAM 33. A reset pulse is obtained every revolution

of the reel 3L, 3C, 3R and the reset pulses are input to the CPU 31 through the reel position detecting circuit 50. The drive pulse counts written in the RAM 33 are cleared to 0 according to the reset pulses thus obtained. Accordingly, the counts 5 corresponding to the rotation positions of the reels 3L, 3C, and 3R within the range of one revolution are stored in the RAM 33.

[0063]

A symbol table is stored in the ROM 32 to relate the rotation positions of the reels 3L, 3C, and 3R and the symbols drawn on 10 the outer peripheral surfaces of the reels to each other. In the symbol table, the code numbers given in sequence every given rotation pitch of each reel 3L, 3C, 3R based on the rotation position where the reset pulse is generated and the symbol codes indicating the symbols provided in one-to-one correspondence 15 with the code numbers are related to each other.

[0064]

A winning symbol combination table is stored in the ROM 32. The winning symbol combination table lists the symbol combinations of winning games, the numbers of payout medals for 20 the winning games, and the winning game determination codes representing the winning games in association with each other. The winning symbol combination table is referenced at the stop control time of the left reel 3L, the center reel 3C, the right reel 3R and when the winning game is confirmed after all reels 25 are stopped.

[0065]

If the internal winning is accepted according to lottery processing based on the random number sampling (probability lottery processing), the CPU 31 sends the stop control signal of the reels 3L, 3C, and 3R to the motor drive circuit 39 based on the operation signal sent from the reel stop signal circuit 46 at the timing at which the player operates the stop buttons 7L, 7C, and 7R, and the selected stop control table. The CPU 31 functions as stop control means for performing stop control of the reels 3L, 3C, and 3R.

[0066]

When the player pushes the stop button 7L, 7C, 7R, the stop control table is referenced and is used to determine the stop position of the reel.

Specifically, when the player pushes the stop button 7L, 7C, 7R, the symbol positioned on the center line 8c on the reel corresponding to the operated stop button (specifically, the symbol whose center is positioned above the center line 8c and is nearest to the position of the center line 8c) is detected, the code number of the symbol (operation position) is collated with the stop control table, and the code number of the symbol to be stopped at the position of the center line 8c (stop position) is determined.

[0067]

The stop control table used when the internal winning of

small prize of bell is accepted will be discussed with reference to FIGS. 7 through 9.

The stop control table lists the stop operation positions and the stop control positions of the reels 3L, 3C, and 3R. The 5 stop operation position represents the code number of the symbol positioned on the center line 8c (specifically, the symbol whose center is positioned above the center line 8c and is nearest to the position of the center line 8c) when the player operates the stop button 7L, 7C, 7R provided corresponding to the reel 3L, 10 3C, 3R. The stop control position represents the code number of the symbol stopped and displayed at the position of the center line 8c when each of the reels stopped by the player actually stops.

[0068]

15 In the embodiment, the number of slide frames is four at the maximum. For example, when "cherry" with code number 12 (symbol 97 in FIG. 4) arrives at the position of the center line 8c while the right reel 3R is rotating, if the player operates the stop button 7R, stop control of the right reel 3R can be 20 performed so as to stop and display "blue 7" with code number 8 (symbol 91 in FIG. 4) at the position of the center line 8c.

[0069]

FIG. 7 shows a winning stop control table. This table is used when stop control of the reels is performed so that 25 "bell-bell-bell" is placed in a row along the activated line and

the winning game of small prize of bell is complete after the internal winning of small prize of bell is accepted.

[0070]

In FIG. 7, the stop control position of the left reel 3L
5 is any of code number 03, 08, 11, 15, or 19. In the symbol row shown in FIG. 4, the symbols corresponding to these code numbers are bell (symbol 94).

[0071]

In FIG. 7, the stop control position of the center reel 10 3C is any of code number "03", "07", "11", "15", or "19". In the symbol row shown in FIG. 4, the symbols corresponding to these code numbers are bell (symbol 94).

[0072]

In FIG. 7, the stop control position of the right reel 3R
15 is any of code number "01", "05", "10", "14", or "18". In the symbol row shown in FIG. 4, the symbols corresponding to these code numbers are bell (symbol 94).

[0073]

If the winning stop control table shown in FIG. 7 is thus
20 used for stop control of the reels 3L, 3C, and 3R, "bell-bell-bell" is stopped and displayed at the position of the center line 8c, namely, at the centers of the display windows 4L, 4C, and 4R, and the winning game is complete.

[0074]

25 FIG. 8 shows a forward push (left center right), center

push (center left right) losing stop control table. This table is used when stop control of the reels is performed so that "bell-bell-bell" is not placed in a row along the activated line (the winning game of small prize of bell is incomplete) after 5 the internal winning of small prize of bell is accepted. The stop control positions corresponding to the stop operation positions of the left reel 3L and the center reel 3C are the same as those shown in FIG. 7.

[0075]

10 In FIG. 8, the stop control position of the right reel 3R is any of code number "02", "06", "11", "15", or "19". In the symbol row shown in FIG. 4, the symbols corresponding to these code numbers are "Replay (symbol 96)."

[0076]

15 If the forward push, center push losing stop control table shown in FIG. 8 is thus used for stop control of the reels 3L, 3C, and 3R, "bell-bell" is stopped and displayed at the centers of the display windows 4L and 4C, and "Replay" is stopped and displayed at the center of the display window 4R and thus the 20 winning game of small prize of bell becomes incomplete.

[0077]

FIG. 9 shows a reverse push (right center left) losing stop control table. This table is used when stop control of the reels is performed so that "bell-bell-bell" is not placed in a row along 25 the activated line (the winning game of small prize of bell is

incomplete) after the internal winning of small prize of bell is accepted. The stop control positions corresponding to the stop operation positions of the center reel 3C and the right reel 3R are the same as those shown in FIG. 7.

5 [0078]

In FIG. 9, the stop control position of the left reel 3L is any of code number "04", "09", "12", "17", or "20". In the symbol row shown in FIG. 4, the symbols corresponding to these code numbers are "Replay (symbol 96)."

10 [0079]

If the reverse push losing stop control table shown in FIG. 9 is thus used for stop control of the reels 3L, 3C, and 3R, "Replay" is stopped and displayed at the center of the left display window 4L and "bell-bell" is stopped and displayed at 15 the centers of the display windows 4C and 4R, and thus the winning game of small prize of bell becomes incomplete.

[0080]

The number of slide frames described above indicates the number of symbols moved until the reel stops after the player 20 operates the stop button and is represented by the absolute value of the difference between the operation position in the stop control table (the code number of the symbol positioned on the center line when the player operates the stop button) and the stop position (the code number of the symbol stopped on the center 25 line when the reel actually stops).

[0081]

The number of slide frames may be called the number of pulled-in frames." In the embodiment, the number of slide frames is four at the maximum. For example, when "cherry" with code number 12 (symbol 97 in FIG. 4) arrives at the position of the center line 8c while the right reel 3R is rotating, if the player operates the stop button 7R, stop control of the right reel 3R can be performed so as to stop and display "blue 7" with code number 08 (symbol 91 in FIG. 4) at the position of the center line 8c.

[0082]

On the other hand, in the stop mode indicating completion of the winning game of internal winning combination, the CPU 31 supplies a payout command signal to the hopper drive circuit 41 for paying out a predetermined number of medals to the player from the hopper 40.

[0083]

At the time, the medal detection section 40S counts the number of medals paid out from the hopper 40. When the count reaches the specified number of medals, a medal payout completion signal is input to the CPU 31, which then stops driving the hopper 40 through the hopper drive circuit 41 and terminates the medal payout processing.

[0084]

FIG. 10 shows the configuration of the sub-control circuit

72. The sub-control circuit 72 performs display control of the liquid crystal display 5 and output control of sound from the speakers 21L and 21R based on the control commands from the main control circuit 71. The sub-control circuit 72, which is
5 implemented on a separate circuit board from the circuit board implementing the main control circuit 71 includes a microcomputer (sub-microcomputer) 73 as the main component, an image control circuit 81 as display control means of the liquid crystal display 5, a sound source IC 78 for controlling sound
10 output from the speakers 21L and 21R, and a power amplifier 79.

[0085]

The sub-microcomputer 73 includes a sub-CPU 74 for performing the control operation following a control command transmitted from the main control circuit 71, program ROM 75 as
15 storage means, and work RAM 76. The signal from the main control circuit 71 to the sub-microcomputer 73 is input through an IN port 77, and the signal to the image control circuit 81 is output through an OUT port 80.

[0086]

20 The sub-control circuit 72 does not include a clock pulse generation circuit, a frequency divider, a random number generator, or a sampling circuit, but executes random number sampling in an operation program of the sub-CPU 74. Generation of the assistance time period is determined as the random number
25 sampling is executed.

[0087]

The sub-CPU 74 includes the number-of-AT-sets counter and a number-of-AT-games counter. The number-of-AT-sets counter stores the number of sets. The number-of-AT-games counter 5 stores information concerning the number of games in one assistance time period.

[0088]

The program ROM 75 stores a control program executed in the sub-CPU 74. The work RAM 76 is used as temporary storage 10 for the sub-CPU 74 to execute the control program.

[0089]

The image control circuit 81 is made up of an image control CPU 82, an image control work RAM 83, image control program ROM 84, image ROM 86, video RAM 87, and an image control IC 88. The 15 image control CPU 82 determines the display contents on the liquid crystal display 5 in accordance with an image control program stored in the image control program ROM 84 based on the parameters set in the sub-microcomputer 73. The signal from the sub-CPU 74 is input through an IN port 85.

20 [0090]

The image control program ROM 84 stores the image control program involved in display on the liquid crystal display 5 and various selection tables. The image control work RAM 83 is used as temporary storage means for the image control CPU 82 to execute 25 the image control program. The image control IC 88 forms an image

responsive to the display contents determined by the image control CPU 82 and outputs the image to the liquid crystal display 5. The image ROM 86 stores dot data for forming an image. The video RAM 87 is used as temporary storage means for the image control IC 88 to form an image.

5 [0091]

On the other hand, the sub-CPU 74 displays an image on the liquid crystal display 5 based on the command signal from the CPU 31.

10 Specifically, whenever a stop signal is input from the reel stop signal circuit 46 as the player operates the start lever 6 or the stop button 7L, 7C, 7R, the sub-CPU 74 transmits a signal to the image control CPU 82 and displays an image on the display screen 5a of the liquid crystal display 5.

15 [0092]

In the embodiment, the CPU 31, the liquid crystal display 5, the sub-CPU 74, and the image control CPU 82 constitutes the display means as a whole.

[0093]

20 The panel display unit 2a is provided with a belly panel (also called decorative panel) 100 for transmitting a part of light from an illumination light member (not shown) positioned on the back to the front. Specifically, the belly panel 100 includes a frame member 110 and a semitransparent member 120 attached to the frame member 110, and the mechanical strength

is held by the frame member 110. The semitransparent member 120 may be made a flat plate, for example, or may be of any other shape and any desired decorative effect can be produced according to the color of the semitransparent member 120, the pattern drawn 5 on the semitransparent member 120, etc. As the semitransparent member 120, a substance having plasticity such as polycarbonate (PC), semitransparent glass, or any other substance may be used.

[0094]

The belly panel 100 may have a part fitted into the cabinet 10 of the panel display unit 2a for attachment or may be attached to the cabinet of the panel display unit 2a so that it can be opened and closed like a door. Specifically, the left or right or upper or lower end of the belly panel 100 may be fixed to the cabinet of the panel display unit 2a using a fitment so that the 15 belly panel 100 can be opened and closed with the fitting as the rotation shaft, and a part of any end other than the end where the fitness is placed may be fitted into the cabinet of the panel display unit 2a and fixed (closed).

[0095]

FIG. 1 is a drawing to show a state in which the belly panel 20 100 is fixed to the panel display unit 2a (closed), needless to say. The belly panel 100 is provided with an opening to attach a transparent member or a semitransparent member, which will be hereinafter referred to simply as transparent member, for 25 transmitting light for illuminating the medal payout opening 15

and the medal reception tray 16 in the vicinity of the medal payout opening 15. To emit light passing through the transparent member, the above-mentioned illumination light member provided on the back of the belly panel 100 may be used or any other member such as 5 an LED (light emitting diode) provided separately from the illumination light member may be used. As the transparent member, a substance having plasticity such as PC, transparent or semitransparent glass, or any other substance may be used.

[0096]

10 FIG. 11 shows the structure of the cabinet portion of the panel display unit 2a positioned on the back of the belly panel 100 to which the transparent member is attached. FIG. 12 is a perspective view to schematically show the portion shown in FIG. 11 or the portion containing the periphery of that portion. In 15 FIG. 11, the front wall of the medal reception tray 16 is removed for convenience of the description. That is, the hatched portion in FIG. 11 indicates the bottom portion of the medal reception tray 16 on which medals are put.

[0097]

20 The frame member 110 of the belly panel 100 with the belly panel 100 attached to the cabinet of the panel display unit 2a as shown in FIG. 1 or 2 is in contact with the lower ends of walls 101a and 101b of the cabinet of the panel display unit 2a inside the lower end of the frame member 110 in FIG. 11 for storing a 25 member such as an illumination light member 104. Therefore, the

walls 101a and 101b of the panel display unit 2a do not transmit light from the illumination light member 104 such as a fluorescent lamp in the direction of the medal reception tray 16. On the other hand, a transparent member placement part 103 for attaching 5 the transparent member for transmitting light for illuminating the medal payout opening 15 and the medal reception tray 16 in the vicinity of the medal payout opening 15 is formed between the walls 101a and 101b of the panel display unit 2a.

[0098]

10 FIGS. 13A and 13B are drawings to show the structure of transparent member of the invention. FIGS. 13A and 13B are perspective views of transparent member 105 observed from the upper front section and from the upper side direction. In FIG. 11, the transparent member 105 is fitted into the transparent 15 member placement part 103 for transmitting the light from the illumination light member 104 the transparent member 105. Here, both lower ends 102a and 102b of the transparent member placement part 103 may be slid for fitting the transparent member 105 into the transparent member placement part 103. FIG. 14 shows the 20 state in which the transparent member 105 is fitted into the transparent member placement part 103. FIG. 15 shows how the transparent member 105 is attached to and fitted into the transparent member placement part 103.

[0099]

25 In FIG. 14, the transparent member 105 is restricted in

motion in the up and down direction and from side to side by the peripheral portion of the transparent member placement part 103 (containing both the lower ends 102a and 102b of the transparent member placement part 103) and is restricted in motion to the 5 depth of the cabinet by the panel display unit 2a, needless to say. Further, the transparent member 105 is also restricted in forward motion (in the opposite direction to the depth of the cabinet) as the belly panel 100 is closed.

[0100]

10 How the transparent member 105 is sandwiched and fixed between the belly panel 100 and the cabinet of the panel display unit 2a will be specifically discussed with FIG. 16. As shown in FIG. 16, the transparent member 105 is sandwiched between the belly panel 100 made up of the frame member 110 and the 15 semitransparent member 120 and the cabinet of the panel display unit 2a and is fitted into the transparent member placement part 103. According to the configuration, the transparent member 105 is restricted in motion in the up and down direction and in the back and forth direction of the plane of the drawing and is fixed.

20 [0101]

Since the transparent member 105 is sandwiched between the belly panel 100 and the cabinet of the panel display unit 2a in the back and forth direction relative to the belly panel 100 (in other words, in the side-to-side direction of the plane of the 25 drawing), the transparent member 105 is restricted in motion and

is fixed. Here, the light from the illumination light member 104 in FIG. 16 passes through the transparent member 105 and illuminates the display means 16 through an opening made in the lower end of the cabinet of the panel display unit 2a and the belly panel 100 (also opening of the transparent member placement part 103).

[0102]

The structure of the transparent member will be discussed. As shown in FIGS. 13A and 13B, the transparent member 105 is made up of a bottom member 105a, a rear member 105b, and two side members 105c. The light emitted from the illumination light member 104 to the medal payout opening 15 passes mostly through the bottom member 105a, needless to say. The rear member 105b is provided for transmitting the transparent member 105 to be stably fitted into the transparent member placement part 103. Further, the side members 105c are provided for providing the mechanical strength of the transparent member 105.

[0103]

The transparent member shown in FIGS. 13A and 13B is only an example of the member incorporating the invention and may have any other structure. Specifically, a structure wherein the side members 105c are removed using strong members as the bottom member 105a and the rear member 105b, a structure wherein the stability of the transparent member is ensured by the side members 105c and the bottom member 105a, or any other structure may be adopted

for providing the function of the transparent member described above. The simplest structure can be provided as the transparent member is implemented only as the bottom member 105a.

[0104]

5 As described above, the machine according to the embodiment of the invention has the transparent member placed detachably between the illumination light member and the medal payout opening. Therefore, it is possible to shorten the time taken for assembling the semitransparent plate placed between the
10 illumination light and the medal payout opening to a decorative panel, and the time taken for replacing and manufacturing.

The transparent member is made up of the bottom member, the rear member, and the side members. Therefore, it is possible to provide the gaming machine that can shorten the time taken
15 for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and to fix the transparent member with good stability.

The transparent member is formed of a plastic member.
20 Therefore, it is possible to shorten the time taken for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and to prevent the transparent member from coming off.

25 The transparent member is sandwiched and fixed between the

cabinet and the belly panel. Therefore, it is possible to shorten the time taken for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and to fix the transparent member with good stability.

The transparent member is colored. Therefore, it is possible to shorten the time taken for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and to produce the decorative effect.

The transparent member is decorated with characters, symbols and patterns. Therefore, it is possible to shorten the time taken for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, and to produce the decorative effect.

[0105]

As described above, according to the invention, the gaming machine for making it possible to shorten the time taken for assembling, replacing and manufacturing the semitransparent plate placed between the illumination light and the medal payout opening to a decorative panel, can be provided.

[0106]

Although only some exemplary embodiments of the invention have been described in detail above, those skilled in the art

will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of the invention. Accordingly, all such modifications are intended to be included within the
5 scope of the invention.

[0107]

This application is related to co-pending U.S. patent applications entitled "GAMING MACHINE" referred to as Attorney Docket No. SHO-0019, "GAMING MACHINE" referred to as Attorney
10 Docket No. SHO-0020, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0021, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0022, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0023, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0024, "GAMING MACHINE" referred to as Attorney
15 Docket No. SHO-0025, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0026, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0027, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0028, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0029, "GAMING MACHINE" referred to as Attorney
20 Docket No. SHO-0030, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0031, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0032, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0033, "GAMING MACHINE" referred to as Attorney Docket No. SHO-0034, "GAMING MACHINE" referred to as Attorney
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10 Docket No. SHO-0045, "GAMING MACHINE" referred to as Attorney
Docket No. SHO-0046, "GAMING MACHINE" referred to as Attorney
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Docket No. SHO-0049, "GAMING MACHINE" referred to as Attorney
15 Docket No. SHO-0050, "GAMING MACHINE" referred to as Attorney
Docket No. SHO-0051, "GAMING MACHINE" referred to as Attorney
Docket No. SHO-0052, "MOTOR STOP CONTROL DEVICE" referred to as
Attorney Docket No. SHO-0053, "GAMING MACHINE" referred to as
Attorney Docket No. SHO-0054, "GAMING MACHINE" referred to as
20 Attorney Docket No. SHO-0055, "GAMING MACHINE" referred to as
Attorney Docket No. SHO-0056, and "GAMING MACHINE" referred to
as Attorney Docket No. SHO-0057, respectively, all the
applications being filed on October 31, 2003 herewith. The
co-pending applications including specifications, drawings, and
25 claims are expressly incorporated herein by reference in their

entirety.